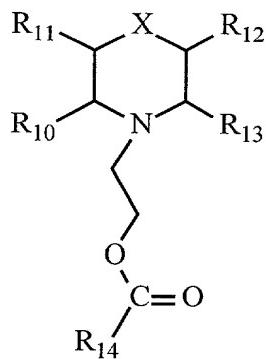


What is claimed is:

1. An element for forming a print-out image comprising:
  - (a) a substrate comprising cellulose having a first surface and a second surface;
  - (b) a dye forming composition on the first surface of the substrate; and
  - (c) a non-dye forming composition on the second surface of the substrate comprising at least one hydrogen donor compound.
- 10 2. The element of Claim 1 wherein the hydrogen donor compound is an organic compound containing an amine group, a hydroxy group, a phosphine group, a phosphoramido group, or a  $\beta$ -dialkylaminocarbonyl moiety.
- 15 3. The element of Claim 2 wherein the hydrogen donor compound is:
  - (i) an aliphatic amine compound having the structural formula:
 
$$(RCH_2)_n(R'CH_2)_mN(Q)_{p-n-m}$$
 wherein p = 3, n and m are 0, 1 or 2, Q is  $CH_2CH_2O_2CR''$  or  $CH_2CH_2COR''$  and
- 20 R, R' and R'' are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms; and
- 25 (ii) a heterocyclic compound having the structural formula:



wherein X is an oxygen atom,  $CH_2$  group, or a bridge to make a 5-membered cyclic amine,

R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, and R<sub>13</sub> are the same or different, hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms, and

5 R<sub>14</sub> is a hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms.

4. The element of Claim 2 wherein the hydrogen donor compound is triethanol amine triacetate, triethanolamine tripropionate, 10 triethanolamine tributyrate, triethanolamine trivalerate, N,N-dibenzylethanolamine acetate, N,N-dibenzylethanolamine propionate, N,N-dibenzylethanolamine butyrate or N-benzyl(diethanolamine diacetate).

5. The element of Claim 2 wherein the hydrogen donor compound is 4-(2-hydroxyethyl)-morpholine acetate, 4-(2-hydroxyethyl)-morpholine propionate, 1-piperidineethanol acetate or 1-pyrrolidineethanol acetate.

6. The element of Claim 2 wherein hydrogen donor compound is triethanolamine triacetate.

7. The element of Claim 2 wherein the hydrogen donor compound is N,N-dibenzylethanolamine acetate.

8. The element of Claim 2 wherein the hydrogen donor compound is 4-(2-hydroxyethyl)-morpholine acetate.

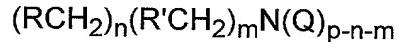
9. The element of Claim 3 wherein the tertiary amine compound is present in the amount of about 2 to about 20% by weight, based on the 25 weight of the total composition.

10. The element of Claim 1 wherein the dye forming composition comprises at least one hydrogen donor compound.

11. The element of Claim 10 wherein the hydrogen donor compound is an organic compound containing an amine group, a hydroxy group, a phosphine group, a phosphoramide group, or a β-dialkylaminocarbonyl moiety.

12. The element of Claim 11 wherein the hydrogen donor compound is:

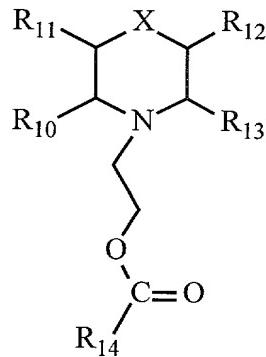
(i) an aliphatic amine compound having the structural formula:



wherein p = 3, n and m are 0, 1 or 2, Q is CH<sub>2</sub>CH<sub>2</sub>O<sub>2</sub>CR" or CH<sub>2</sub>CH<sub>2</sub>COR" and

R, R' and R" are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms; and

- 5 (ii) a heterocyclic compound having the structural formula:



wherein X is an oxygen atom, CH<sub>2</sub> group, or a bridge to make a 5-membered cyclic amine,

- 10 R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, and R<sub>13</sub> are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms, and

- 15 R<sub>14</sub> is a hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms.

13. The element of Claim 12 wherein the hydrogen donor compound is triethanol amine triacetate, triethanolamine tripropionate, triethanolamine tributyrate, triethanolamine trivalerate, N,N-dibenzylethanolamine acetate, N,N-dibenzylethanolamine propionate, N,N-dibenzylethanolamine butyrate or N-benzyl(diethanolamine diacetate).

14. The element of Claim 11 wherein the hydrogen donor compound is 4-(2-hydroxyethyl)-morpholine acetate, 4-(2-hydroxyethyl)-morpholine propionate, 1-piperidineethanol acetate or 1-pyrrolidineethanol acetate.

15. The element of Claim 11 wherein the hydrogen donor compound is triethanolamine triacetate.

- 30 16. The element of Claim 11 wherein the hydrogen donor compound is N,N-dibenzylethanolamine acetate.

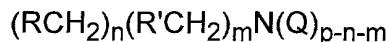
17. The element of Claim 11 wherein the hydrogen donor compound is 4-(2-hydroxyethyl)-morpholine acetate.
18. The element of Claim 12 wherein the tertiary amine compound in the dye forming composition is present in the amount of 2 to 20 % by weight, based on the weight of the total composition.
- 5 19. The element of Claim 2 wherein the dye forming composition comprises:
- (1) a film forming polymeric binder,
- (2) a photooxidant,
- 10 (3) a leuco dye,
- (4) up to 10 % by weight, based on the weight of the total composition, of an acid, and
- (5) a mixture comprising (a) at least one photoreducible quinone, and (b) at least one hydrogen donor compound.
- 15 20. The element of Claim 19 wherein the polymeric binder is a cellulose acetate ester.
21. The element of Claim 19 wherein the polymeric binder is poly(vinyl butyral).
22. The element of Claim 19 wherein the leuco dye is an 20 aminotriarylmethane, aminoanthene, aminothioxanthene, amino-9,10-dihydroacridine, aminophenoxazine, aminophenothiazine, amino-dihydrophenazine, aminodiphenyl methane, leuco indamine, aminohydrocinnamic acid (cyanoethane, leuco methine) and corresponding ester, hydrazine, leuco indigoid dye, amino 2,3-dihydroanthraquinone, tetrahalo-p,p'-biphenol, 2(p-hydroxyphenyl)-4,5-diphenylimidazole, indanone, phenethylaniline, or combination thereof.
- 25 23. The element of Claim 22 wherein the leuco dye is 4,4',4"-methylidynetris[N,N-diethyl-3-methyl-benzenamine].
24. The element of Claim 19 wherein the photooxidant is 30 2,4,5,2',4',5'-hexaaryl-biimidazole dimer.
25. The element of Claim 24 wherein the 2,4,5,2',4',5'-hexaaryl-biimidazole compound is TCDM-HABI.
26. The element of Claim 19 wherein the acid is dodecylbenzene sulfonic acid, p-toluene sulfonic acid, lower alkyl toluene sulfonic acid or higher alkyl toluene sulfonic acid.
- 35 27. The element of Claim 19 wherein the acid is dodecylbenzene sulfonic acid.

28. The element of Claim 19 wherein the photoreducible quinone is 1,6-pyrenequinone, 1,8-pyrenequinone, 9,10-phenanthrenequinone or mixtures thereof.

29. An element for forming a print-out image in which a substrate of  
5 the element has, on a first surface thereof, a dye forming composition comprising a hydrogen donor compound and the substrate has, on a second surface thereof, a non-dye forming composition comprising a hydrogen donor compound.

30. The element of Claim 29 wherein the hydrogen donor  
10 compound is:

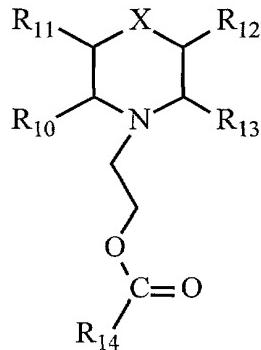
- (i) an aliphatic amine compound having the structural formula:



wherein p = 3, n and m are 0, 1 or 2, Q is  $CH_2CH_2O_2CR''$  or  
15  $CH_2CH_2COR''$  and

R, R' and R'' are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms; and

20 (ii) a heterocyclic compound having the structural formula:

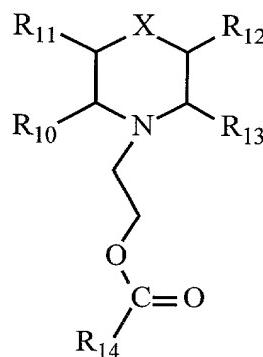


wherein X is an oxygen atom,  $CH_2$  group, or a bridge to make a 5-membered cyclic amine,  
25

$R_{10}$ ,  $R_{11}$ ,  $R_{12}$ , and  $R_{13}$  are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms, and

$R_{14}$  is a hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms.

31. The element of Claim 29 in which the substrate comprises cellulose.
- 5      32. A process for forming a print-out image comprising:
- (a) providing a substrate comprising cellulose having a first surface and a second surface;
- 10     (b) applying a dye forming composition to the first surface of the substrate; and
- (c) applying a non-dye forming composition to the second surface of the substrate, wherein the non-dye forming comprises at least one hydrogen donor compound.
- 15     33. The process of Claim 32 wherein the hydrogen donor compound is:
- (i) an aliphatic amine compound having the structural formula:
- $(RCH_2)_n(R'CH_2)_mN(Q)_{p-n-m}$
- 20     wherein  $p = 3$ ,  $n$  and  $m$  are 0, 1 or 2,  $Q$  is  $CH_2CH_2O_2CR''$  or  $CH_2CH_2COR''$  and
- $R$ ,  $R'$  and  $R''$  are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms; and
- 25     (ii) a heterocyclic compound having the structural formula:



30     wherein  $X$  is an oxygen atom,  $CH_2$  group, or a bridge to make a 5-membered cyclic amine,

$R_{10}$ ,  $R_{11}$ ,  $R_{12}$ , and  $R_{13}$  are the same or different hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms, and

5            $R_{14}$  is a hydrogen atom, or alkyl group of 1 to 12 carbon atoms, or aryl group of 6 to 10 carbon atoms, or alkylaryl group of 7-20 carbon atoms, or alkoxyalkyl group of 1 to 12 carbon atoms.

34. The process of Claim 32 wherein the dye forming composition comprises a hydrogen donor compound.

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